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UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION of: COX, ET AL.

Confirmation Number: 3942

Application No.: 10/731,411

Group Art Unit: 1649

Filed: December 8, 2003

Examiner: Daniel E. Kolker, Ph.D.

For: NEUROTOXIC AMINO ACID OR NEUROTOXIC DERIVATIVES THEREOF  
ASSOCIATED WITH NEUROLOGICAL DISORDERS

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

TRANSMITTAL LETTER FOR RULE 132 DECLARATION

Transmitted herewith for filing in the above-identified application, is a declaration under 37 C.F.R. §1.132 with the following:

- (1) Declaration of Dr. Paul Alan Cox under 37 C.F.R. §1.132, with *curriculum vitae* attached; graph showing experimental results attached at Exhibit 1
- (2) Return postcard

Applicants believe no fees are due. If any fees are due, authorization is hereby made to charge fees to Deposit Account No. 03-3975. Please charge any additional fees required by this paper or credit any overpayment in the manner authorized above. A duplicate of this paper is attached.

Date:

May 16, 2006  
11682 El Camino Real, Suite 200  
San Diego, CA 92130-2092  
858 509.4093

PILLSBURY WINTHROP SHAW PITTMAN LLP  
DONNA O. PERDUE  
Reg. No. 51166

CERTIFICATION UNDER 37 C.F.R. §§ 1.8 and/or 1.10\*

I hereby certify that, on the date shown below, this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: May 16, 2006

Signature

PATRICIA MUNOZ

(type or print name of person certifying)

\* Only the date of filing (§ 1.6) will be the date used in a patent term adjustment calculation, although the date on any certificate of mailing or transmission under § 1.8 continues to be taken into account in determining timeliness..



U.S. Serial No. 10/731,411 Cox *et al.*  
Attorney Docket No. 042733 0307218

THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Filed: December 8, 2003	)	
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For: NEUROTOXIC AMINO ACID OR	)	
NEUROTOXIC DERIVATIVE THEREOF	)	
ASSOCIATED WITH NEUROLOGICAL	)	
DISORDERS	)	

**DECLARATION OF DR. PAUL ALAN COX UNDER 37 C.F.R. § 1.132**

Assistant Commissioner for Patents  
U.S. PATENT AND TRADEMARK OFFICE  
Box 1450  
Alexandria, VA 22313-1450

Sir:

I, the undersigned Paul Alan Cox, Ph.D., do hereby declare:

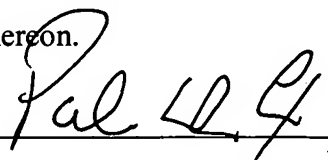
1. I am a co-inventor of the subject matter claimed in the above-identified United States Patent Application, Serial No. 10/731,411, filed at the United States Patent and Trademark Office on December 8, 2003.
2. I am currently Executive Director of the Institute for Ethnomedicine and have held this position since January 1, 2005. Prior to that date, I served as Executive Director of the National Tropical Botanical Garden from 1998 to 2004. I obtained a Bachelor of Science degree in Botany and Philosophy at Brigham Young University in 1976, and a Master of Science degree in Ecology at the University of Wales in 1978. I completed an A.M. in Biology at Harvard University in 1978 and a Ph.D. in Biology at Harvard University in 1981. My *curriculum vitae* is attached.
3. I have reviewed the claims that are presently under examination.

4. I have read the Office Action mailed December 29, 2005, and the Advisory Action mailed March 14, 2006, in the above-identified application, and am familiar with the Examiner's rejection of the claims.
5. I submit this declaration in support of the fact that BMAA can be detected in a tissue sample from an asymptomatic subject who is later diagnosed with a neurological disorder, such that the presence of BMAA or a BMAA derivative in the sample from the asymptomatic subject indicates the subject is at risk of having the neurological disorder.
6. The following study, performed in my laboratory by co-inventor Dr. Susan Murch under my direction, employed compositions and techniques very similar to those disclosed in the specification in Example 4 to determine total BMAA in tissue.
7. Hair samples were obtained from a woman living in Canada who collected and saved samples of her own hair at intervals over a period of 49 years, beginning in 1939 and ending in 1988. Samples were collected in the years 1939, 1941, 1944, 1947, 1957, 1962, 1963, 1980, 1986, and 1988. Her family gave our laboratory these samples and the permission to analyze them for BMAA. BMAA levels in the hair samples were measured as described in the following paragraph.
8. Each hair sample was weighed, hydrolyzed in 6.0 M sodium hydroxide for 12-18 hours, and then filtered through a 0.2 micron filter. Each filtrate was dried in a vacuum centrifuge, reconstituted in borate buffer (0.5M), and then derivatized with 6-aminoquinolyl-N-hydroxysuccinimidyl carbamate (ACQ). BMAA levels were measured in each hair sample processed as described above, using HPLC techniques as described in the specification, with minor modifications. BMAA was separated from other protein amino acids by reverse phase elution (Waters Nova-Pak C<sub>18</sub> column, 300 mm x 3.9 mm) with 140 mM sodium acetate, 5.6 mM triethylamine, pH 5.2 (mobile phase A) and 52% acetonitrile in water (mobile phase B) at 37°C. The standard amino acid elution gradient was modified for BMAA separation (0.0 min = 100% A , 2.0 min = 90% A curve 11, 5.0 min = 86% A curve 11, 10.0 min = 86% A curve 6, 18.0 min = 73% A curve 6, 30.0 min = 60% A curve 10, 35.0 min = 40% A curve 6, 38.0 min = 100% B, 45 minutes = 100%

A). BMAA concentration was determined by detection of the fluorescent tag using a Waters 2487 Dual-1 Fluorescence Detector, with excitation at 250 nm and emission at 395 nm. BMAA levels were determined by comparison with a BMAA standard at a concentration representing a single mid-range concentration as described in the specification. The results were expressed as micrograms of BMAA per gram of hair ( $\mu\text{g/g}$ ). The limit of detection was 0.000065  $\mu\text{mol}$  per injection and the limit of quantification was 0.0065  $\mu\text{mol}$  per injection. Each sample was analyzed in triplicate to assure consistency and reproducibility of the results.

9. Exhibit 1, submitted herewith, is a bar graph showing the results from our measurements of total BMAA levels in hair samples taken from the same individual at intervals from 1939 to 1988.
10. The individual from whom the hair samples were obtained was diagnosed with multiple neurological disorders including Alzheimer's Disease and progressive supranuclear palsy (PSP) beginning in 1988 at the age of 63, and up to her death in 2001 at the age of 75.
11. Because BMAA can be detected in tissue samples from a subject before the onset of symptoms (Exhibit 1), screening a human subject at risk of having a neurological disorder can be performed by analyzing a tissue sample from the subject to determine the presence of BMAA or a BMAA derivative, wherein the presence of BMAA or a BMAA derivative in the sample indicates the subject is at risk of having the neurological disorder.
12. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

By:

  
Paul Alan Cox, Ph.D.

Date: 12 May 2006



**Paul Alan Cox**  
Curriculum Vitae

**Degrees**

Ph.D. (Biology)	Harvard University	1981
A.M. (Biology)	Harvard University	1978
M.Sc. (Ecology)	University of Wales	1978
B.S. (Botany)	Brigham Young University	1976

**Postdoctoral Experience**

Miller Research Fellow, Miller Institute for Basic Research in Science	University of California, Berkeley	1981-1983
Melbourne Research Fellow	University of Melbourne	1985-1986

**Academic Positions**

Executive Director	Institute for Ethnomedicine	2005-
Executive Director	National Tropical Botanical Garden	1998-2004
Distinguished Professor	Brigham Young University-Hawaii	2000-
King Gustaf XVI Professor of Environmental Sci.	Swedish Agricultural University	1997-
Dean of General Education & Honors	Brigham Young University	1993-1997
Professor	Brigham Young University	1991-1998
Associate Professor	Brigham Young University	1986-1991
Assistant Professor	Brigham Young University	1983-1986
Visiting Professor	Uppsala University	1990
Visiting Professor	Umeå University	1990

**Academic Honors**

E. K. Janaki Ammal Medal	Society of Ethnobotanists, India	2000
Doctor of Science <i>Honoris Causa</i>	University of Guelph	2000
Fellow of the Pacific	Hawaii Pacific University	1999
Plenary Speaker	XVI International Botanical Congress	1999
TIME Hero of Medicine	Time Magazine	1997
Presidential Young Investigator Award	National Science Foundation	1985-1990
Reynolds Lecturer	Brigham Young University	1993
King of Sweden Speaker	Royal Traveller's Club, Stockholm	1988
Danforth Fellow	Danforth Foundation	1976-1981
Fulbright Fellow	U.S. Government	1976-1977
N.S.F. Fellow	National Science Foundation	1977-1981
Bowdoin Prize in English	Harvard University	1981
Bowdoin Prize in English	Harvard University	1978
Valedictorian, Highest Honors, Summa Cum Laude	Brigham Young University	1976
Joseph Fielding Smith Scholar	Brigham Young University	1971-1976

**Teaching Honors**

Best overall teacher	Brigham Young University	1997
Teacher of the Year	Botany Dept., Brigham Young University	1993
Teacher of the Year	Botany Dept., Brigham Young University	1992
Teacher of the Year	Botany Dept., Brigham Young University	1991
Professor of the Year	Brigham Young University	1988
Teacher of the Year	Botany Dept., Brigham Young University	1988

**Research Support**

International Drug Discovery (\$340,000)	National Institute of Health	2003
ALS/PDC Research (\$250,000)	Castle Foundation	2003
Undergraduate Science Teaching (\$255,000)	Kenan Foundation	2002
ALS/PDC Research (\$37,773)	Amyotrophic Lateral Sclerosis Assoc.	2002
Science Education (\$100,000)	National Science Foundation	1994
Samoan Hurricanes (\$9,000)	US National Park Service	1992
Samoan Flying Foxes (\$90,000)	World Wildlife Fund	1988-1992
PYI Award (\$337,500)	National Science Foundation	1985-1990
USA-Sweden Coop. (\$24,000)	National Science Foundation	1989-1990

R.E.U. Supplement (\$39,000)	National Science Foundation	1988-1991
R.E.U. Supplement (\$9,000)	National Science Foundation	1987
Supercomputer use (127 CPUH)	IBM	1988
Computer Equipment (\$39,000)	Data General	1986
Research Grant (\$13,000)	Institute of Polynesian Studies	1985
Research Grant (\$3,900)	National Geographic Society	1983
Research Grant (\$3,500)	American Philosophical Society	1982
Doctoral Dissertation Grant (\$5,000)	National Science Foundation	1980
Research Grant (\$600)	Sigma Xi	1981
Research Grant (\$1,800)	Pacific Tropical Botanical Garden	1980
Atkins Fund Grant (\$3,900)	Harvard University	1979-1980
Anderson Fund Grant (\$3,000)	Harvard University	1979

#### **Environmental Awards**

Rachel Carson Award, National Nutritional Foods Association	1999
Goldman Environmental Prize (\$75,000)	1997
Nu Skin Force for Good Award (\$10,000)	1996
American Freedom Festival Award	1993

#### **Scholarly Duties**

Foreign Member, General Section, The Royal Swedish Academy of Agriculture and Forestry	1999-
Affiliate Member, Ecology, Evolution and Conservation Biology Program, University of Hawaii at Manoa	1999-
Board Member, Hawaii Reserves, Inc.	1999-
Chairman, Advisory Board, National Park of American Samoa	1999-
Chairman, The Seacology Foundation	1992-
Board Member, Center for Plant Conservation	2002-
Board Member, AIDS ReSearch Alliance	2003-
Research Associate, Botanical Research Institute of Texas	
Past President, Society for Economic Botany	
Past President, International Society for Ethnopharmacology	
Fellow, Linnean Society of London	
Editorial Board, <i>Pacific Studies</i>	
Chairman of the Board, Meridian School	
International World Wildlife Fund Delegate to Convention on International Trade in Endangered Species (CITES), Lausanne, Switzerland	1989
Executive Committee, National Science Foundation Panel on Science Education in 2010	
Panel Member, National Science Foundation Undergraduate Science and Math Education Program	
Panel Member, National Institutes of Health Natural Product Developmental Therapeutics Program	
Advisory Board, American Botanical Council	

#### **Documentary Films**

"Nafanua: Saving the Samoan Rainforest" (Scandinature Films, Sweden in association with ITV-4 England and the Australian Broadcasting Corporation). Winner of 1st Prize, U.S. Environmental Film Festival.

"Green Medicine" (Scandinature Films, Sweden)

#### **Professional Societies**

Former President, Society for Economic Botany

Former President, International Society for Ethnopharmacology

American Association for the Advancement of Science

British Ecological Society

Ecological Society of America

Association for Tropical Biology

American Society of Naturalists

Society for the Study of Ethnobiology

American Society of Pharmacognosy

#### **Community Involvement**

Helped create 20,000 Tafua Rainforest Preserve, Western Samoa.	1990
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Helped gain CITES (Convention on International Trade on Endangered Species) protection for Pacific flying foxes. Lausanne, Switzerland	1989
Helped create 15,000 acre American Samoa National Park	1988
Helped create 30,000 acre Falealupo Rain Forest Preserve in Western Samoa	1987
Founder, Seacology Foundation	

## **Publications**

### **Books:**

- (4) Balick, M. J. and Cox, P. A. 1998. Drogen, Kräuter und Kulturen: Pflanzen und die Geschichte des Menschen. Translated by Sebastian Vogel. Spektrum Akademischer Verlag, Heidelberg.
- (3) Cox, P. A. 1997. Nafanua: Saving the Samoan Rainforest. W. H. Freeman, New York.
- (2) Balick, M. J. and Cox, P. A. 1996. Plants, People and Culture: The Science of Ethnobotany. Scientific American Library, New York.
- (1) Cox, P. A. and Banack, S. A. (eds.). 1991. Islands, Plants, and Polynesians. Discorides Press.

### **Articles:**

- (145) Cox, P.A. 2006. Healing Plants of Oceania. Pg. 346-353. In: Foster, Steven and Johnson, Rebecca L. (eds). *Desk Reference to Nature's Medicine*, Washington, D.C.: National Geographic.
- (144) Cox, P.A. 2005. The Seven Pillars of Ethnomedical Wisdom. *Ethnobotany* 17: 24-35.
- (143) Cox, P.A. 2006. Paley's Stone, Creationism, and Conservation. Pg. 33-42. In: Handley, George B., Ball, Terry B. and Peck, Steven L. (eds). *Stewardship and the Creation*, Provo, Utah: Brigham Young University.
- (142) Cox, P.A., Banack, S.A., Murch, S., Bell, A., Nunn, P., Bradley, W., Mash, D., Papapetropoulos, S., Pablo, J., Ronnevi, L-O., Conradi, S., Bergman, B., Rasmussen, U., Bidigare, R., Codd, G.A., Metcalf, J.S. Johnson, H., Speth, R., Weiss, J.H. December 22, 2006. Correspondence to "Lack of  $\beta$ -methylamino-L-alanine in brain from controls, AD, or Chamorros with PDC." *Neurology*. In press.
- (141) Wyllie-Echeverria, S., Wyllie-Echeverria, V.R., Churchill, A.C., Cox, P.A., 2006. Further evidence for seed size variation in the genus *Zostera*: Exploratory studies with *Zostera japonica* and *Zostera asiatica*. *Aliso* 22(1): 241-245. In press.
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- (139) Cox, P.A. 2004. Indigenous horticulturists and human health: an ethnobotanical approach. *Acta Hort.* (ISHS) 642: 173-185.
- (138) Togashi, T., Bartelt, J.L., and Cox, P.A. 2004. Simulation of gamete behaviors and the evolution of anisogamy: reproductive strategies of marine green algae. *Ecological Research* 19:563-569.
- (137) Togashi, T., Miyazaki, T., and Cox, P.A. 2002. Sexual reproduction in marine green algae: gametic behavior and the evolution of anisogamy. In: *Proceedings of Two Symposia on Ecology and Evolution in VIII INTECOL*, Seoul, Korea, 2002 (J. Yoshimura, N. Nakagiri and W.M. Shields, Eds.), pp. 70-79. Otsu: Sangaku Publisher.
- (136) Murch, S.J., Cox, P.A., Banack, S. A., Steele, J.C., Sacks, O.W. 2004. Occurrence of  $\beta$ -methylamino-L-alanine (BMAA) in ALS/PDC patients from Guam. *Acta Neurologica Scandinavica* 110: 267-269.

- (135) Murch, S.J., Cox, P.A., Banack, S.A. 2004. A mechanism for slow release of biomagnified cyanobacterial neurotoxins and neurodegenerative disease in Guam. *Proceedings of the National Academy of Sciences* 101(33): 12228-12231.
- (134) Ragone, D., Tavana, G., Stevens, J.M., Stewart, P.A., Stone, R., Cox, P.M., Cox, P.A. 2004. Nomenclature of breadfruit cultivars in Samoa: Saliency, ambiguity, and monomiality. *Journal of Ethnobiology* 24(1): 33-49.
- (133) Togashi, T. and Cox, P.A. 2004. Phototaxis and the evolution of isogamy and 'slight anisogamy' in marine green algae: insights from laboratory observations and numerical experiments. *Botanical Journal of the Linnean Society* 144: 321-327.
- (132) Cox, P.A., Banack, S.A., and Murch, S.J. 2003. Biomagnification of cyanobacterial neurotoxins and neurodegenerative disease among the Chamorro people of Guam. *Proceedings of the National Academy of Sciences* 100(23):13380-13383.
- (131) Banack, S.A., and Cox, P.A. 2003. Distribution of the neurotoxic non-protein amino acid BMAA in *Cycas micronesica* Hill. *Botanical Journal of the Linnean Society* 143:165-168.
- (130) Banack, S.A., and Cox, P.A. 2003. Biomagnification of cycad neurotoxins in flying foxes: implications for ALS-PDC in Guam. *Neurology* 61: 387-389.
- (129) Tavana, G., Stewart, P., Snyder, S., Ragone, D., Fredrickson, K., Cox, P.A., and Borel, J. 2003. Lack of evidence of kava-related hepatotoxicity in native populations in Savaii, Samoa. *HerbalGram* 59: 28-32.
- (128) Wyllie-Echeverria, S., Cox, P.A., Churchill, A.C., Brotherson, J.D., and Wyllie-Echeverria, T. 2003. Seed size variation within *Zostera marina* L. (Zosteraceae). *Botanical Journal of the Linnean Society* 142(3): 281-288.
- (127) Monson, Clark S., Banack, Sandra Anne and Cox, Paul Alan. 2003. Conservation Implications of Chamorro Consumption of Flying Foxes as a Possible Cause of Amyotrophic Lateral Sclerosis-Parkinsonism Dementia Complex in Guam. *Conservation Biology* 17 (3): 678-686.
- (126) Cox, P.A. 2003. Introduction. Pg. xiv-xxv. In: *Linnaeus' Philosophia Botanica*, translated by S. Freer, 1st English ed., New York: Oxford University Press.
- (125) Cox, P.A. 2003. Forests, Flying Foxes and Samoans: An Ecological Triangle. *Plant Talk* 31: 19-23.
- (124) Cox, P.A. and O.W. Sacks. November 26, 2002. Cycad neurotoxins, consumption of flying foxes, and ALS/PDC disease in Guam. *Neurology* 59(10):1664-1665.
- (123) Uchida, K., Ichimori, K., Paulson, G.S., Cox, P.A., Sone, F., and Samarawickrema, W.A. 2002. Laboratory Studies of *Ochlerotatus Samoanus* in Association with Leaf Axils of *Freycinetia* (Pandanaceae) in Samoa. *Journal of the American Mosquito Control Association* 18(2):81-85.
- (122) Cox, P.A. 2001. Ensuring Equitable Benefits: The Falealupo Covenant and the Isolation of Anti-Viral Drug Prostratin from a Samoan Medicinal Plant. *Pharmaceutical Biology* 39(Supplement): 33-40.
- (121) Cox, P.A. and O.W. Sacks. 2002. Cycad neurotoxins, consumption of flying foxes, and ALS-PDC disease in Guam. *Neurology* 58:956-959.
- (120) Hart, K.H. and P.A. Cox. 2000. A Cladistic Approach to Comparative Ethnobotany: Dye Plants of the Southwestern United States. *Journal of Ethnobiology* 20(2):303-325.
- (119) Cox, P.A. 2001. The Fall of Giants. *Plant Talk* 26:3.
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- (117) Cox, P.A. 2000. An Introduction to the National Tropical Botanical Garden. *Plant Talk* 22/23:29–33.
- (116) Cox, Paul. 2001. Richard Evans Schultes: In Memoriam. *HerbalGram* 52:62.
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- (113) Cox, P.A. 2001. Carl Linnaeus: The Roots of Ethnobotany. *Odyssey* 10(2): 6–8.
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- (110) Cox, P.A., Elmqvist, T. 2000. Pollinator Extinction in the Pacific Islands. *Conservation Biology* 14(5): 1237–1239.
- (109) Cox, P.A. 2000. A Tale of Two Villages: Culture, Conservation, and Ecocolonialism in Samoa. Pg. 330–344. In: Zerner, Charles (ed). *People, Plants, and Justice: The Politics of Nature Conservation*, New York: Columbia University Press.
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- (107) Cox, P.A. 2000. Endangered Plants, Vanishing Cultures: Ethnobotany and Conservation. Pg. 435–442. In: Raven, P.H., Williams, T. (eds). *Nature and Human Society: The Quest for a Sustainable World. Proceedings of the 2nd National Forum on Biodiversity*, Washington, D.C. October 1997. Washington, DC: National Academy Press.
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- (105) Wyllie-Echeverria, S. and P.A. Cox. 1999. The seagrass (*Zostera marina* [Zosteraceae]) industry of Nova Scotia 1907-1960. *Economic Botany* 53(4): 519-526.
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- (102) Cox, P.A. 1999. The Unfinished Journey of Carl Linnaeus. *Plant Talk* 16: 33-36.
- (101) Cox, P.A. 1998. The Promise of Gerard's *Herball*: New Drugs From Old Books. *Endeavour* 22(2): 51-53.
- (100) Burton, R.A., Cox, P.A. 1998. Sugarbeet Culture and Mormon Economic Development in the Intermountain West. *Economic Botany* 52 (2): 201-206.
- (99) Allen-Wardell, G., P. Bernhardt, R. Bitner, A. Burquez, S. Buchmann, J. Cane, P.A. Cox, V. Dalton, P. Feinsinger, M. Ingram, D. Inouye, C.E. Jones, K. Kennedy, P. Kevan, H. Koopowitz, R. Medellin, S. Medellin-Morales, G.P. Nabhan. February 1998. The Potential Consequences of

Pollinator Declines on the Conservation of Biodiversity and Stability of Food Crop Yields. *Conservation Biology* 12 (1): 8-17.

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(97) Hettinger, A.L. and Cox, P.A. 1997. The Making of the Kato Alu—A Traditional Tongan Basket. *Economic Botany* 51 (2): 144-148.

(96) Cox, P. A. and Elmqvist, T. 1997. Ecocolonialism and Indigenous-Controlled Rainforest Preserves in Samoa. *Ambio* 26 (2): 84-89.

(95) Cox, P.A., 1997. Indigenous Peoples and Conservation. Pg. 207-220. F. Grifo and J. Rosenthal [Eds.], *Biodiversity and Human Health*, Island Press, Washington, D.C.

(94) Balick, M.J., Cox, P.A. April 1997. New Crops from Old: Amaranth and Hemp. *Healthy & Natural Journal* 4 (2): 22-24.

(93) Cox, P.A., Elmqvist, T. 1996. The Evolution of Vivipary in Flowering Plants. *Oikos* 77: 3-9.

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(90) Cox, P.A., 1996. Herbert Baker: A Good Eye. *Fremontia* 24 (2): 27-28.

(89) Cox, P.A., 1996. From the Cradle of Creation: The Beliefs of a Young Botanist. Pg. 102-109. S.E. Black [Ed.], *Expressions of Faith: Testimonies of Latter-day Saint Scholars*, Deseret Book, Salt Lake City, Utah.

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- (2) Cox, P. A. 1980. Masi and tanu 'eli: Ancient Polynesian technologies for the preservation and concealment of food. *Bulletin of the Pacific Tropical Botanical Garden*: 81-93.
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#### **Patents**

- (1) Prostratin: A Novel Anti-HIV Compound (patent no. 5,599,839, issued February 4, 1997). Jointly submitted with the National Cancer Institute.
- (2) An anti-inflammatory compound from a Samoan medicinal plant. Jointly submitted with Schering-Plough.

#### **Translations**

1987. 'O le manatu fa'atu mo se Paka Fa'aleatunu'u. 'O motu 'o Tutuila ma Ta'u, Amerika Samoa. (National Park Proposal, Islands of Tutuila and Ta'u, American Samoa). U. S. National Park Service. [English to Samoan].

#### **Invited Seminars**

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| "Ecosocial Systems, Biodiversity, and Intellectual Property Rights: Applying the Rio Treaties to Drug Development in Samoa," Royal Swedish Academy of Agriculture and Forestry | 2006 |
| "Cycads, cyanobacteria, and neurodegenerative illness among the Chamorro people of Guam," Singapore Botanic Gardens  | 2006 |
| "Cyanobacterial neurotoxins and neurological illness," San Francisco State University  | 2006 |
| "Cyanobacteria, Cycads, and Chamorros: New Insights into Neurodegenerative Disease," University of Illinois, Chicago   | 2005 |
| "Cyanobacteria, Cycads, and Chamorros: A New Approach to ALS/PDC in Guam," University of California, San Francisco Medical School Grand Rounds                                 | 2005 |
| "Cyanobacteria, Cycads, and Chamorros: A New Approach to ALS/PDC in Guam," Buck Institute, Novato, California  | 2005 |
| "Cyanobacteria, cycads, and Chamorros: The cyanobacterial neurotoxin BMAA and neurological disease," Mie University, Japan   | 2005 |
| "Cyanobacteria, cycads, and Chamorros: The cyanobacterial neurotoxin BMAA and neurological disease," Wenner-Gren International Symposium, Stockholm, Sweden                    | 2005 |
| "The Seven Pillars of Ethnomedical Wisdom", International Forum for Social Sciences & Health World Congress, Istanbul, Turkey  | 2005 |
| "Sexual selection and the evolution of anisogamy," XVII International Botanical Congress 2005, Vienna, Switzerland   | 2005 |
| "Plants, People, and Phytochemicals: Therapies or Threats," General Lecture at XVII International Botanical Congress 2005, Vienna, Switzerland                                 | 2005 |
| "Cyanobacterial Toxins and Neurological Disease Among the Chamorro People of Guam" Uppsala University, Sweden  | 2005 |
| "Biomagnification of cyanobacterial neurotoxins in diverse ecosystems," University of Mississippi  | 2005 |
| "Biomagnification of cyanobacterial neurotoxins in diverse ecosystems," 105 <sup>th</sup> General Meeting American Society for Microbiology, Atlanta, Georgia                  | 2005 |
| "Cyanobacteria, cycads, and ALS/PDC among the Chamorro people of Guam," Society for Economic Botany, Texas Christian University  | 2005 |
| "The Search for New Cures," Western Independent Bankers 2005, Poipu Beach, Hawaii  | 2005 |

"Ethnobotany and the discovery of new antiviral drugs," Neurological Update 2005, Miami, Florida	2005
"Cyanobacterial toxins and neurological disease among the Chamorro people of Guam," Neurological Update 2005, Miami, Florida	2005
"Biomagnification of cyanobacterial neurotoxins and neurodegenerative disease amongst the Chamorro people of Guam," Cycad 2005 conference, Xalapa, Mexico	2005
"Cyanobacterial neurotoxins and neurodegenerative disease among the Chamorro people of Guam," University of Utah, Salt Lake City, Utah	2004
"Environmental neurotoxins, ALS/PDC and ALS," International Symposium on ALS/MND, Philadelphia, Pennsylvania	2004
"New insights into ALS, Alzheimer's and Parkinson's Disease from studies of the Chamorro people of Guam," Rotary Club of Honolulu, Honolulu, Hawaii	2004
"Cyanobacteria, cycads, and flying foxes: biomagnification among the Chamorro people of Guam," Natural History Museum, London, United Kingdom	2004
"Cyanobacterial neurotoxins and chronic neurodegeneration among the Chamorro people of Guam," University of Dundee, Scotland	2004
"Environmental neurotoxins and progressive neurodegenerative disease among the Chamorro people of Guam," Karolinska Institute, Sweden	2004
"Biomagnification of cycad neurotoxins in flying foxes: implication for ALS-PDC in Guam," Ecology, Evolution, and Conservation of Islands Bats Symposia of the 2004 Association for Tropical Biology and Conservation Annual Meeting, Miami, Florida	2004
"Cyanobacteria, Cycads, and Neurological Disease Among the Chamorro People of Guam" University of Zurich, Switzerland	2004
"Progressive Neurological Disease among the Chamorro People of Guam: New Insights from Ethnobotany," Dr. Thomas J. and Jane A. Vanzant Memorial Lecture, Rice University, Houston, Texas	2004
"Ethnotaxonomy and Biological Conservation Among Indigenous People," Yale University	2004
"Biomagnification of Cyanobacterial Neurotoxins and Neurodegenerative Disease among the Chamorro People of Guam," Yale University	2004
"Biomagnification of Cycad Neurotoxins and Progressive Neurological Disease Among the Chamorro People of Guam," University of Utah, Salt Lake City, Utah	2004
"New Medicines From Tropical Island Plants," College of Science Harold W. Ritchy Lecture Series, Weber State University, Ogden, Utah	2003
"Biomagnification of cycad neurotoxins and ALS-PDC in Guam," Pacific Health Research Institute, Honolulu, Hawaii	2003
"Biomagnification of Neurotoxins and ALS/PDC in Guam," University of Chicago, Illinois	2003
"Biomagnification of Cycad Neurotoxins and Neurodegenerative Disease Among the Chamorro People of Guam," Princeton University, New Jersey	2003
"Ethnobotany and Medicine," Santa Barbara Women's Lawyers, Santa Barbara, California	2003
"Gardens by the Sea: Islands, Ethnobotany, and Human Disease," Garden Club of American Zone VIII Meeting, Palm Beach, Florida	2003
"Ethnobotany, New Drugs, and Old Diseases," Thornton-Massa Distinguished Lecture, Colorado State University, Fort Collins, Colorado	2003
"Ethnobotany, New Drugs, and Old Diseases," Brigham Young University-Hawaii, Laie, Hawaii	2003
"Ethnobotany, New Drugs, and Old Diseases," Hawaiian Education Council, Mauna Kea, Hawaii	2003
"Island Peoples and Human Health: An Ethnobotanical Approach," Plenary Lecture for Neuroscience Session, Research Centers in Minority Institutions, University of Hawaii at Manoa, Honolulu, Hawaii	2002
"Ethnobotany and Indigenous Perspectives on Disease," Boston Museum of Science Boston, Massachusetts	2002
"Ethnobotany and Indigenous Perspectives on Disease," Massachusetts College of Pharmacy and Health Sciences, Boston, Massachusetts	2002
"Ethnobotany and Indigenous Perspectives on Disease," Elon University, Raleigh, North Carolina	2002
"Indigenous Horticulturists and Human Health: An Ethnobotanical Approach," XXVI International Horticultural Congress, Toronto, Canada	2002
"Future of Communities and Knowledge," Brigham Young University-Hawaii, Laie, Hawaii	2002
"Ethnobotanical Insights into the Cause of ALS, Alzheimer's and Parkinson's among the Chamorro of Guam," UC Botanical Garden Herbert Baker Memorial Lecture, California	2002



"Ethnobotany and the Search for New Drugs," Naples Botanical Garden, Naples, Florida	2002
"Ethnobotany and Conservation: The New Frontier," Preservation Foundation of Palm Beach, Pan's Garden, Florida	2002
"Ethnobotany Leads to New Botanical Supplements," Plenary Lecture, American Society of Pharmacognosy, Monterey, California	2001
"Ethnobotany and the Search for New Drugs," Plenary Session, American Association of Physician Specialists, McLean, Virginia	2001
"The Name of the Rose: Convergence of Indigenous Knowledge Systems with Western Taxonomy," University of Minnesota	2001
"Ethno-taxonomy and the Convergence of Scientific and Indigenous Classification Systems," University of Arizona	2001
"Ethnobotany and the Search for New Drugs," Hawaii Tropical Flowers & Foliage Association	2001
"Ethnobotany and the Search for New Drugs," Brigham Young University-Hawaii, Laie, Hawaii	2001
"The Name of the Rose: Convergence of Indigenous Knowledge Systems with Western Taxonomy," Brigham Young University-Hawaii, Laie, Hawaii	2001
"The Name of the Rose: Convergence of Indigenous Knowledge Systems with Western Taxonomy," Hawaii Botanical Society, University of Hawaii, Honolulu, Hawaii	2001
"Indigenous Knowledge and the Formulation of Conservation Policy," The Royal Swedish Academy of Sciences, Stockholm, Sweden	2000
Phipps Conservatory and Botanical Garden, Pittsburgh, Pennsylvania	2000
"Gardens, Libraries, and Museums: Three Pillars of Biodiversity Research for the New Millennium," The Natural History Museum, London, England	2000
"Discovering New Drugs in Plant Paradise," New Orleans Museum of Art, New Orleans, Louisiana	2000
"Unfinished Journey: The Exploration of Lapland by Carl Linnaeus and the Discovery of Ethnobotany," The University of Texas at Austin	2000
"The Biology of Jurassic Park: Plant Conservation in Kauai at the National Tropical Botanical Garden," The University of Texas at Austin	2000
"Diversity," Convocation Address, University of Guelph, Canada	2000
"Ethnobotany and the Search for New Drugs," Botany Department, University of Guelph	2000
"Conservation, Ethnobotany and the Search for New Medicines from Plants," Massachusetts College of Pharmacy and Health Sciences, Boston, Massachusetts	1999
"Plant Conservation in Jurassic Park: Saving Hawaii's Most Endangered Plants," Museum of Science, Boston, Massachusetts	1999
"Tribal Knowledge in the Millennium?" Tulane University, New Orleans, Louisiana	1999
"Will Tribal Knowledge Survive the Millennium?" University of Colorado, Boulder	1999
"The Search for New Drugs from Tropical Plants," Denver Botanic Garden, Denver, Colorado	1999
"Adventure in Lapland," University of Hawaii, Honolulu, Hawaii	1999
"Diversity," Commencement Address, Hawaii Pacific University, Honolulu, Hawaii	1999
"Plant Conservation and the Search for New Medicines," Japanese Women's Society of Honolulu Honolulu, Hawaii	1999
"Unfinished Journey: Carl Linnaeus' Travels in Lapland and the Creation of Ethnobotany," XVI International Botanical Congress, St. Louis, Missouri	1999
"The Search for Plant Medicines," Santa Barbara Museum of Natural History, Santa Barbara California	1999
"Change," Commencement Address, Meridian School, Provo, Utah	1999
"Conservation at the National Tropical Botanical Garden," Hawaiian Educational Council, Honolulu, Hawaii	1999
"BYU Faculty as Disciple-Scholars," New Faculty Seminar, Brigham Young Univ., Provo, Utah	1999
"Ethnobotany and the Search for New Drugs," Portland Women's Club, Portland, Oregon	1999
"Ethnobotany and the Search for New Drugs," Vanderbilt University, Nashville, Tennessee	1999
"Ethnobotany and the Search for New Drugs," Filoli Center, California	1999
"Ethnobotany and the Search for New Drugs," Atherton Garden Club, San Francisco, California	1999
"Conservation Biology in Jurassic Park," Honolulu Garden Club, Honolulu, Hawaii	1999
"Forest Preservation in Samoa," Association for Social Anthropology in Oceania, Hilo, Hawaii	1999
"Conservation Biology in Jurassic Park," Topical Lecture at the Association for the Advancement of Science Meeting, Anaheim, California	1999
"Nafanua: Saving the Samoan Rain Forest," General Education Book of the Semester Lecture,	1998

Brigham Young University, Provo, Utah	
"Ethnobotany and the Search for New Drugs," Santa Barbara Botanical Garden, California	1998
"Nafanua: Saving the Samoan Rain Forest," Association for Mormon Letters, Salt Lake City, Utah	1998
"Ethnobotany and the Search for New Drugs," Convocation Address at Elon College, N. Carolina	1998
"Polynesian Healing," Wilcox Memorial Hospital, Lihue, Hawaii	1998
"Biodiversity Conservation in Northern Europe," Final Lecture at the Plant Europa Conference, Uppsala, Sweden	1998
"The Unfinished Journey of Carl Linnaeus," Keynote talk for Planta Europa, Uppsala, Sweden	1998
"Carl Linnaeus in Lapland," Swedish Linnean Society at Hammerby, Uppsala, Sweden	1998
"The Unfinished Journey of Carl Linnaeus: Ethnobotany and Drug Discovery," Gifford Arboretum Lecture, University of Miami	1998
"Four Hundred Years of Gerald's Herball," Swedish Agricultural University, Sweden	1998
"Protecting Plant Biodiversity," Biodiversity Conference, Uppsala, Sweden	1998
"Seagrass Pollination," Ekobyskolan, Uppsala, Sweden	1998
"The Unfinished Journey of Carl Linnaeus," Royal Academy of Agricultural Sciences, Stockholm	1998
"The Unfinished Journey of Carl Linnaeus," J. Dwyer Endowed Lecture, St. Louis University	1998
"Ethnobotany and the Search for New Drugs," ExpoWest, Anaheim, California	1998
"Future Uses of Biodiversity," CBM	1998
"The Unfinished Journey of Carl Linnaeus," Rijksmuseum	1998
"Ethnobotany and the Search for New Drugs," Freiburg University, Germany	1998
"Carl Linnaeus and the Development of Ethnobotany," Princeton University	1998
"The Unfinished Journey of Carl Linnaeus," King Carl XVI Professor Inauguration, SLU and Uppsala University	1998
"The Unfinished Journey of Carl Linnaeus," Skansen Museum, Stockholm, Sweden	1997
"The Unfinished Journey of Carl Linnaeus," Julita Museum, Sweden	1997
"The Unfinished Journey of Carl Linnaeus," Helsingborg Museum, Helsingborg, Sweden	1997
"The Unfinished Journey of Carl Linnaeus," Ajta Museum, Jokkmokk, Sweden	1997
"Four Hundred Years of Gerard's Herball," Linnean Society, Chelsea Physics Garden, U.K.	1997
Man and the Forest, Svenska Samernas Riksförbund-SSR, Jokkmokk, Sweden	1996
Ecology and Evolution of Plant Reproduction, Umeå, Sweden	1996
Hogle Zoo, Salt Lake City, Utah	1996
Los Angeles Academy of Medicine, California	1996
Jane & Whitney Harris Lecture, University of Missouri-St. Louis	1996
Banquet Speaker, International Congress of Plant Reproduction '96, Lorne, Australia	1996
American Association for the Advancement of Science, Baltimore	1996
University of Utah	1995
Shaman Pharmaceuticals, San Francisco	1995
Alliance Pharmaceuticals, San Diego	1995
Biodiversity and Human Health Conference, The Smithsonian Institution	1995
Andalas University, Sumarta, Indonesia	1994
Selby Botanical Gardens, Florida	1994
Snow College	1994
University of Arizona	1994
University of South Florida, Tampa	1994
Intl Soc. Ethnopharmacology, Beijing	1994
European Phytochemical Society, Lausanne	1993
University of Honheim, Germany	1993
American Society for Pharmacognosy	1993
Society for Economic Botany	1993
Am. Assoc. of Botanical Gardens	1993
Royal Botanic Gardens, Kew London	1993
Stanford University	1993
S.W. Association Bot. Gardens Santa Fe	1992
New York Botanical Garden	1992
Forum, Ricks College	1992
Int. Soc. Ethnopharmacology, Sweden	1992
Sandoz, Basle, Switzerland	1992

AIBS "Plants & Polynesians" Honolulu	1992
Rainforest Chemistry, Indonesia	1992
American Anthropological Association	1991
Schering Research Institute	1991
Harvard University	1991
The Royal Society, London	1991
Western Society of Naturalists	1991
The Natural History Museum, London	1990
Ciba/Chulabhorn Inst., Bangkok	1990
Royal Botanic Gardens, Kew	1990
Friday Harbor Laboratories	1989
Royal Travellers Club, Stockholm	1989
University of Umea	1989
Uppsala University	1989
Fairchild Tropical Gardens	1988
University of Utah	1988
University of Uppsala	1988
British Museum, London	1988
University of Canterbury, New Zealand	1988
Ethnobotany Conference, Christchurch	1988
University of Basel, Switzerland	1988
S.U.N.Y. Stony Brook	1987
University of Hamburg, W. Germany	1987
Int. Botanical Congress, Berlin	1987
Umeå University, Sweden	1987
Uppsala University, Sweden	1987
Missouri Botanical Garden	1986
Harvard University	1986
New York Botanical Garden	1986
National Science Foundation	1986
National Cancer Institute	1986
University of California, Berkeley	1986
AJB Symposium: Biology of the Spadix	1986
AIBS Symposium: Evolution of Monocots	1986
Deakin University, Australia	1986
Pollination '86, Australia	1986
Monash University, Australia	1986
Royal Botanical Gardens, Sydney	1986
University of Melbourne	1986
H. Carson Festschrift: Founder Effect	1985
University of the South Pacific, Fiji	1985
Canyonlands Natural History Association	1985
University of Miami	1985
University of Melbourne	1984
University of Utah	1984
Harvard University	1983
Univ. of Massachusetts, Amherst	1983
University of Connecticut, Storrs	1983
Cornell University	1983
University of California, Davis	1983
University of California, Berkeley	1983
Brigham Young University	1983
California State University, Hayward	1983
California State University, San Diego	1983
Stanford University	1982
Bay Area Biosystematists	1982
University of Utah	1982
Bishop Museum	1982

Universidad de Los Andes, Venezuela	1982
University of the South Pacific	1981
California Botanical Club	1981
Harvard University	1981
Pacific Tropical Botanical Garden	1981
Arnold Arboretum	1981
Evolutionary Biology Congress	1981
University of Hawaii	1980
Society for the Study of Evolution	1979

